

REMARKS

Status of the Claims

Claims 2-28 are pending. Claim 1 was previously canceled. Claim 2 has been amended to correct the capitalization of FCC. Claims 4-26 were previously withdrawn from consideration.

Claim 27 was previously canceled.

Claim 28 was added to recite particular embodiment of the present application. Support for the new claim 28 can be found, for example, in the specification as filed, at page 8, lines 8-11. No new matter has been added.

In a Final Office Action dated October 12, 2007, Claims 2, 3 and 27 were rejected under 35 U.S.C. §103(a) as being unpatentable over Japanese Patent Publication No. JP 06-128671 to Kazuo Yamanaka et al. ("Yamanaka"). Applicant submitted an Amendment After Final and corresponding Rule 132 Declaration on January 25, 2008. In an Advisory Action dated February 4, 2008, the Examiner advised Applicant that the Amendment was entered, but that the Declaration was not entered. Applicants resubmit the Declaration for the Examiner's consideration. Applicant respectfully requests that the Declaration be entered.

Applicants wish to reiterate arguments made in the Amendment after Final filed January 25, 2008. Particularly, one of skill in the art would not expect similar properties to those exhibited by Applicant's claimed invention from the composition of Yamanaka. The present invention achieves improved corrosion resistance in supercritical water environments containing phosphoric acid through the use of critical amounts of molybdenum.

Further, the amounts of silicon, chromium and iron are critical to achieve the novel effects of the present invention - improved strength and exceptional corrosion resistance. The composition disclosed by Yamanaka does not achieve any of these effects.

As more fully discussed in the January 25, 2008 Amendment and corresponding Declaration, applicants achieved new and unexpected results with their invention; results unachievable by the Yamanaka composition. Applicant resubmits the attached Rule 132 Declaration, which includes experimental data demonstrating the novel results unachievable by Yamanaka. For the Examiner's convenience, Applicant resubmits the arguments and remarks regarding the 132 Declaration made in the earlier January 25, 2008 Amendment below:

...Applicant submits that the ranges claimed by claim 2 are not obvious in view of Yamanaka. According to MPEP § 2144.05 III, Applicant “can rebut a *prima facie* case of obviousness based on overlapping ranges by showing the criticality of the claimed range.” Criticality is demonstrated by showing that “there are new and unexpected results relative to the prior art.” MPEP § 2144.05 III (*quoting Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1322, 73 USPQ2d 1225, 1228 (Fed. Cir. 2004)). Applicant achieved new and unexpected results associated with the invention claimed by claim 2, and submits experimental data in the attached Rule 132 Declaration which demonstrates that these results are not achieved by the compositions of Yamanaka.

As described in the attached Rule 132 Declaration, experiments were performed to examine the criticality of the ranges claimed by claim 2 of the present invention. Through use of flow-type corrosion test apparatuses, the tester performed corrosion tests on various Ni-based alloy sheets in an environment including supercritical water containing inorganic acids. When each of Cr, Fe, and Si are outside the range claimed by claim 2 of the present invention, significant weight reduction of the Ni-based alloy is observed. This weight reduction corresponds to the corrosion caused by the supercritical water containing inorganic acids.

In contrast, the corrosion experiments described in the patent specification demonstrate a significant difference in the amount of alloy corroded when the composition is within the ranges claimed by claim 2. See for example, Tables A1 to A3 on pages 33-35 of the specification as filed. Specifically, Table A1, reproduced below, highlights the superior qualities that are achieved when the alloy falls within the range claimed by claim 2.

Table A1

Ni based alloy sheet		Composition (% by weight)									Corrosion tests using simulated VX gas decomposition supercritical water solution		Corrosion tests using simulated GB gas decomposition supercritical water solution	
		Cr	Mo	Mg	N	Mn	Fe	Si	C#	Ni and unavoidable impurities	weight reduction in solution test specimen (mg/cm ²)	weight reduction in aged test specimen (mg/cm ²)	weight reduction in solution test specimen (mg/cm ²)	weight reduction in aged test specimen (mg/cm ²)
Present Invention	A1	44.0	1.00	0.008	0.021	0.07	-	-	0.02	remainder	3	4	5	6
	A2	43.1	0.31	0.006	0.008	0.22	-	-	0.02	remainder	7	7	8	8
	A3	49.7	0.45	0.007	0.011	0.13	-	-	0.03	remainder	4	8	3	9
	A4	44.2	0.12	0.011	0.021	0.28	-	-	0.02	remainder	4	6	5	7
	A5	43.2	1.96	0.021	0.013	0.10	-	-	0.02	remainder	5	7	6	8
	A6	45.6	0.46	0.001	0.014	0.09	-	-	0.01	remainder	4	6	2	4
	A7	44.0	0.36	0.049	0.002	0.14	-	-	0.02	remainder	5	9	5	9
	A8	44.5	0.35	0.022	0.039	0.12	-	-	0.02	remainder	4	6	6	7
	A9	46.5	0.47	0.006	0.022	0.05	-	-	0.02	remainder	3	5	7	9
	A10	45.1	0.49	0.008	0.025	0.49	-	-	0.01	remainder	4	6	5	8
	A11	45.6	0.48	0.031	0.018	0.13	0.05	-	0.03	remainder	5	6	6	7
	A12	43.3	0.47	0.026	0.009	0.24	0.98	-	0.02	remainder	4	7	7	9
	A13	44.4	0.48	0.017	0.022	0.17	-	0.01	0.02	remainder	3	5	6	8
	A14	44.1	0.46	0.004	0.022	0.11	-	0.09	0.02	remainder	4	6	5	7

C# refers to the C quantity incorporated as an unavoidable impurity

From the results of the experimental data produced in the attached Rule 132 Declaration, it can be confirmed that, if any of Si, Cr and Fe is beyond the range claimed by claim 2, while within the range disclosed by Yamanaka, the corrosion resistance deteriorates in supercritical water environments containing inorganic acids (i.e., the observed weight reductions range from 13 to 41 mg/cm²), such that the effects achieved by the present invention cannot be achieved.

The outcome of the experiments described in the Rule 132 Declaration are not surprising. Yamanaka does not teach or suggest the use of his alloy in the environments similar to those contemplated by the present invention. Yamanaka teaches that his composition can be used in lead-containing hot water and thick alkali, (i.e., basic, environments). In contrast, the present invention teaches a composition that is ideal for acidic environments.

In summary, the invention claimed by claim 2 of the present invention provides for superior corrosion resistance in supercritical water environments containing inorganic acids. It has been shown, in the case that all of the contents of Si, Cr and Fe are beyond the range claimed by claim 2, but within the range disclosed by Yamanaka, the corrosion resistance in these environments is markedly deteriorated.

Applicant submits that the ranges of amounts of Cr, Fe and Si as claimed are critical to achieve the results obtained by present invention.

For at least these reasons, Applicant submits claim 2 of the present invention is not obvious in view of Yamanaka and stands in condition for allowance.

Accordingly, Applicant respectfully requests that the rejection of claim 2 be withdrawn. Claim 3 depends from allowable claim 2. For at least this reason, Applicant respectfully requests that the rejection of claim 3 be withdrawn.

Finally, nowhere does Yamanaka teach a system for a supercritical water process reaction apparatus, as is claimed in new claim 28.

For at least these reasons, Applicant believes the claims stand in condition for allowance.


CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

The Examiner is respectfully requested to contact the undersigned at the telephone number indicated below if the Examiner believes any issue can be resolved through either a Supplemental Response or an Examiner's Amendment.

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Respectfully submitted,

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Attachment: Declaration Under 37 C.F.R. §1.132